

SEQUENCE LISTING

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 Miller , Charles
 Catalan, John Avram
 Monath, Thomas P.

<120> West Nile Virus Vaccine

<130> 06132/075002

<140> US 10/715,868

<141> 2003-11-17

<150> US 60/426,592

<151> 2002-11-15

<160> 9

<170> PatentIn version 3.3

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Met Ser Lys Lys Pro Gly
1 5
ggg ccc ggc aag agc cgg gct gtc aat atg cta aaa cgc gga atg ccc 162
Gly Pro Gly Lys Ser Arg Ala Val Asn Met Leu Lys Arg Gly Met Pro
10 15 20
cgc gtg ttg tcc ttg att gga ctg aag agg gct atg ttg agc ctg atc 210
Arg Val Leu Ser Leu Ile Gly Leu Lys Arg Ala Met Leu Ser Leu Ile
25 30 35
gac ggc aag ggc cca ata cga ttt gtg ttg gct ctc ttg gcg ttc ttc 258
Asp Gly Lys Gly Pro Ile Arg Phe Val Leu Ala Leu Leu Ala Phe Phe
40 45 50
agg ttc aca gca att gct ccg acc cga gca gtg ctg gat cga tgg aga 306
Arg Phe Thr Ala Ile Ala Pro Thr Arg Ala Val Leu Asp Arg Trp Arg
55 60 65 70
ggg gtg aac aaa caa aca gcg atg aaa cac ctt ctg agt ttt aag aag 354
Gly Val Asn Lys Gln Thr Ala Met Lys His Leu Leu Ser Phe Lys Lys
75 80 85
gaa cta ggc acc ttg acc agt gct atc aat cgg cgg agc tca aaa caa 402
Glu Leu Gly Thr Leu Thr Ser Ala Ile Asn Arg Arg Ser Ser Lys Gln
90 95 100
aag aaa aga gga gga aag acc gga att gca gtc atg att ggc ctg atc 450
Lys Lys Arg Gly Gly Lys Thr Gly Ile Ala Val Met Ile Gly Leu Ile
105 110 115
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Ala Ser Val Gly Ala Val Thr Leu Ser Asn Phe Gln Gly Lys Val Met
120 125 130
atg acg gta aat gct act gac gtc aca gat gtc atc acg att cca aca 546
Met Thr Val Asn Ala Thr Asp Val Thr Asp Val Ile Thr Ile Pro Thr
135 140 145 150
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Ala Ala Gly Lys Asn Leu Cys Ile Val Arg Ala Met Asp Val Gly Tyr
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Met Cys Asp Asp Thr Ile Thr Tyr Glu Cys Pro Val Leu Ser Ala Gly
170 175 180
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Asn Asp Pro Glu Asp Ile Asp Cys Trp Cys Thr Lys Ser Ala Val Tyr
185 190 195
gtc agg tat gga aga tgc acc aag aca cgc cac tca aga cgc agt cgg 738

Val Arg Tyr Gly Arg Cys Thr Lys Thr Arg His Ser Arg Arg Ser Arg	
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Arg Ser Leu Thr Val Gln Thr His Gly Glu Ser Thr Leu Ala Asn Lys	
215 220 225 230	
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Lys Gly Ala Trp Met Asp Ser Thr Lys Ala Thr Arg Tyr Leu Val Lys	
235 240 245	
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Thr Glu Ser Trp Ile Leu Arg Asn Pro Gly Tyr Ala Leu Val Ala Ala	
250 255 260	
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Val Ile Gly Trp Met Leu Gly Ser Asn Thr Met Gln Arg Val Val Phe	
265 270 275	
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Val Val Leu Leu Leu Leu Val Ala Pro Ala Tyr Ser Phe Asn Cys Leu	
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Gly Met Ser Asn Arg Asp Phe Leu Glu Gly Val Ser Gly Ala Thr Trp	
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Val Asp Leu Val Leu Glu Gly Asp Ser Cys Val Thr Ile Met Ser Lys	
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Asp Lys Pro Thr Ile Asp Val Lys Met Met Asn Met Glu Ala Ala Asn	
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Leu Ala Glu Val Arg Ser Tyr Cys Tyr Leu Ala Thr Val Ser Asp Leu	
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Ser Thr Lys Ala Ala Cys Pro Thr Met Gly Glu Ala His Asn Asp Lys	
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cgt gct gac cca gct ttt gtg tgc aga caa gga gtg gtg gac agg ggc	1266
Arg Ala Asp Pro Ala Phe Val Cys Arg Gln Gly Val Val Asp Arg Gly	
375 380 385 390	
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Trp Gly Asn Gly Cys Gly Leu Phe Gly Lys Gly Ser Ile Asp Thr Cys	
395 400 405	
gcc aaa ttt gcc tgc tct acc aag gca ata gga aga acc atc ttg aaa	1362
Ala Lys Phe Ala Cys Ser Thr Lys Ala Ile Gly Arg Thr Ile Leu Lys	
410 415 420	
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Glu Asn Ile Lys Tyr Glu Val Ala Ile Phe Val His Gly Pro Thr Thr	

425	430	435	
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gga gaa tat gga gag gtg aca gtg gac tgt gaa cca cgg tca ggg att Gly Glu Tyr Gly Glu Val Thr Val Asp Cys Glu Pro Arg Ser Gly Ile 475 480 485			1554
gac acc aat gca tac tac gtg atg act gtt gga aca aag acg ttc ttg Asp Thr Asn Ala Tyr Tyr Val Met Thr Val Gly Thr Lys Thr Phe Leu 490 495 500			1602
gtc cat cgt gag tgg ttc atg gac ctc aac ctc cct tgg agc agt gct Val His Arg Glu Trp Phe Met Asp Leu Asn Leu Pro Trp Ser Ser Ala 505 510 515			1650
gga agt act gtg tgg agg aac aga gag acg tta atg gag ttt gag gaa Gly Ser Thr Val Trp Arg Asn Arg Glu Thr Leu Met Glu Phe Glu Glu 520 525 530			1698
cca cac gcc acg aag cag tct gtg ata gca ttg ggc tca caa gag gga Pro His Ala Thr Lys Gln Ser Val Ile Ala Leu Gly Ser Gln Glu Gly 535 540 545 550			1746
gct ctg cat caa gct ttg gct gga gcc att cct gtg gaa ttt tca agc Ala Leu His Gln Ala Leu Ala Gly Ala Ile Pro Val Glu Phe Ser Ser 555 560 565			1794
aac act gtc aag ttg acg tcg ggt cat ttg aag tgt aga gtg aag atg Asn Thr Val Lys Leu Thr Ser Gly His Leu Lys Cys Arg Val Lys Met 570 575 580			1842
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ttc aag ttt ctt ggg act ccc gca gac aca ggt cac ggc act gtg gtg Phe Lys Phe Leu Gly Thr Pro Ala Asp Thr Gly His Gly Thr Val Val 600 605 610			1938
ttg gaa ttg cag tac act ggc acg gat gga cct tgc aaa gtt cct atc Leu Glu Leu Gln Tyr Thr Gly Thr Asp Gly Pro Cys Lys Val Pro Ile 615 620 625 630			1986
tcg tca gtg gct tca ttg aac gac cta acg cca gtg ggc aga ttg gtc Ser Ser Val Ala Ser Leu Asn Asp Leu Thr Pro Val Gly Arg Leu Val 635 640 645			2034
act gtc aac cct ttt gtt tca gtg gcc acg gcc aac gct aag gtc ctg Thr Val Asn Pro Phe Val Ser Val Ala Thr Ala Asn Ala Lys Val Leu 650 655 660			2082

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gga gaa caa cag atc aat cac cat tgg cac aag tct gga agc agc att Gly Glu Gln Gln Ile Asn His His Trp His Lys Ser Gly Ser Ser Ile 680 685 690	2178
ggc aaa gcc ttt aca acc acc ctc aaa gga gcg cag aga cta gcc gct Gly Lys Ala Phe Thr Thr Thr Leu Lys Gly Ala Gln Arg Leu Ala Ala 695 700 705 710	2226
cta gga gac aca gct tgg gac ttt gga tca gtt gga ggg gtg ttc acc Leu Gly Asp Thr Ala Trp Asp Phe Gly Ser Val Gly Gly Val Phe Thr 715 720 725	2274
tca gtt ggg aag gct gtc cat caa gtg ttc gga gga gca ttc cgc tca Ser Val Gly Lys Ala Val His Gln Val Phe Gly Gly Ala Phe Arg Ser 730 735 740	2322
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gct gac act ggg tgt gcc ata gac atc agc cgg caa gag ctg aga tgt Ala Asp Thr Gly Cys Ala Ile Asp Ile Ser Arg Gln Glu Leu Arg Cys 795 800 805	2514
gga agt gga gtg ttc ata cac aat gat gtg gag gct tgg atg gac cgg Gly Ser Gly Val Phe Ile His Asn Asp Val Glu Ala Trp Met Asp Arg 810 815 820	2562
tac aag tat tac cct gaa acg cca caa ggc cta gcc aag atc att cag Tyr Lys Tyr Tyr Pro Glu Thr Pro Gln Gly Leu Ala Lys Ile Ile Gln 825 830 835	2610
aaa gct cat aag gaa gga gtg tgc ggt cta cga tca gtt tcc aga ctg Lys Ala His Lys Glu Gly Val Cys Gly Leu Arg Ser Val Ser Arg Leu 840 845 850	2658
gag cat caa atg tgg gaa gca gtg aag gac gag ctg aac act ctt ttg Glu His Gln Met Trp Glu Ala Val Lys Asp Glu Leu Asn Thr Leu Leu 855 860 865 870	2706
aag gag aat ggt gtg gac ctt agt gtc gtg gtt gag aaa cag gag gga Lys Glu Asn Gly Val Asp Leu Ser Val Val Val Glu Lys Gln Glu Gly 875 880 885	2754

atg tac aag tca gca cct aaa cgc ctc acc gcc acc acg gaa aaa ttg Met Tyr Lys Ser Ala Pro Lys Arg Leu Thr Ala Thr Thr Glu Lys Leu 890 895 900	2802
gaa att ggc tgg aag gcc tgg gga aag agt att tta ttt gca cca gaa Glu Ile Gly Trp Lys Ala Trp Gly Lys Ser Ile Leu Phe Ala Pro Glu 905 910 915	2850
ctc gcc aac aac acc ttt gtg gtt gat ggt ccg gag acc aag gaa tgt Leu Ala Asn Asn Thr Phe Val Val Asp Gly Pro Glu Thr Lys Glu Cys 920 925 930	2898
ccg act cag aat cgc gct tgg aat agc tta gaa gtg gag gat ttt gga Pro Thr Gln Asn Arg Ala Trp Asn Ser Leu Glu Val Glu Asp Phe Gly 935 940 945 950	2946
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aca act gaa tgt gac tcg aag atc att gga acg gct gtc aag aac aac Thr Thr Glu Cys Asp Ser Lys Ile Ile Gly Thr Ala Val Lys Asn Asn 970 975 980	3042
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tgc agg agc tgc acc tta cca cca ctg cgc tac caa act gac agc	3450

Cys Arg	Ser Cys Thr Leu Pro	Pro Leu Arg Tyr Gln	Thr Asp Ser	
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ggc tgt	tgg tat ggt atg gag	atc aga cca cag aga	cat gat gaa	3495
Gly Cys	Trp Tyr Gly Met Glu	Ile Arg Pro Gln Arg	His Asp Glu	
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aag acc	ctc gtg cag tca caa	gtg aat gct tat aat	gct gat atg	3540
Lys Thr	Leu Val Gln Ser Gln	Val Asn Ala Tyr Asn	Ala Asp Met	
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Ile Asp	Pro Phe Gln Leu Gly	Leu Leu Val Val Phe	Leu Ala Thr	
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cag gag	gtc ctt cgc aag agg	tgg aca gcc aag atc	agc atg cca	3630
Gln Glu	Val Leu Arg Lys Arg	Trp Thr Ala Lys Ile	Ser Met Pro	
1165	1170	1175		
gct ata	ctg att gct ctg cta	gtc ctg gtg ttt ggg	ggc att act	3675
Ala Ile	Leu Ile Ala Leu Leu	Val Leu Val Phe Gly	Gly Ile Thr	
1180	1185	1190		
tac act	gat gtg tta cgc tat	gtc atc ttg gtg ggg	gca gct ttc	3720
Tyr Thr	Asp Val Leu Arg Tyr	Val Ile Leu Val Gly	Ala Ala Phe	
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gca gaa	tct aat tcg gga gga	gac gtg gta cac ttg	gcg ctc atg	3765
Ala Glu	Ser Asn Ser Gly Gly	Asp Val Val His Leu	Ala Leu Met	
1210	1215	1220		
gcg acc	ttc aag ata caa cca	gtg ttt atg gtg gca	tcg ttt ctc	3810
Ala Thr	Phe Lys Ile Gln Pro	Val Phe Met Val Ala	Ser Phe Leu	
1225	1230	1235		
aaa gcg	aga tgg acc aac cag	gag aac att ttg ttg	atg ttg gcg	3855
Lys Ala	Arg Trp Thr Asn Gln	Glu Asn Ile Leu Leu	Met Leu Ala	
1240	1245	1250		
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Ala Val	Phe Phe Gln Met Ala	Tyr His Asp Ala Arg	Gln Ile Leu	
1255	1260	1265		
ctc tgg	gag atc cct gat gtg	ttg aat tca ctg gcg	gta gct tgg	3945
Leu Trp	Glu Ile Pro Asp Val	Leu Asn Ser Leu Ala	Val Ala Trp	
1270	1275	1280		
atg ata	ctg aga gcc ata aca	ttc aca acg aca tca	aac gtg gtt	3990
Met Ile	Leu Arg Ala Ile Thr	Phe Thr Thr Thr Ser	Asn Val Val	
1285	1290	1295		
gtt ccg	ctg cta gcc ctg cta	aca ccc ggg ctg aga	tgc ttg aat	4035
Val Pro	Leu Leu Ala Leu Leu	Thr Pro Gly Leu Arg	Cys Leu Asn	
1300	1305	1310		
ctg gat	gtg tac agg ata ctg	ctg ttg atg gtc gga	ata ggc agc	4080
Leu Asp	Val Tyr Arg Ile Leu	Leu Leu Met Val Gly	Ile Gly Ser	

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ttg atc agg gag aag agg agt	gca gct gca aaa aag	aaa gga gca	4125
Leu Ile Arg Glu Lys Arg Ser	Ala Ala Ala Lys Lys	Lys Gly Ala	
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agt ctg cta tgc ttg gct cta	gcc tca aca gga ctt	ttc aac ccc	4170
Ser Leu Leu Cys Leu Ala Leu	Ala Ser Thr Gly Leu	Phe Asn Pro	
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atg atc ctt gct gct gga ctg	att gca tgt gat ccc	aac cgt aaa	4215
Met Ile Leu Ala Ala Gly Leu	Ile Ala Cys Asp Pro	Asn Arg Lys	
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cgc gga tgg ccc gca act gaa	gtg atg aca gct gtc	ggc cta atg	4260
Arg Gly Trp Pro Ala Thr Glu	Val Met Thr Ala Val	Gly Leu Met	
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Phe Ala Ile Val Gly Gly Leu	Ala Glu Leu Asp Ile	Asp Ser Met	
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gcc att cca atg act atc gcg	ggg ctc atg ttt gct	gct ttc gtg	4350
Ala Ile Pro Met Thr Ile Ala	Gly Leu Met Phe Ala	Ala Phe Val	
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Ile Ser Gly Lys Ser Thr Asp	Met Trp Ile Glu Arg	Thr Ala Asp	
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Val Asp Val Arg Leu Asp Asp	Asp Gly Asn Phe Gln	Leu Met Asn	
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Asp Pro Gly Ala Pro Trp Lys	Ile Trp Met Leu Arg	Met Val Cys	
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Val Gly Phe Trp Ile Thr Leu	Gln Tyr Thr Lys Arg	Gly Gly Val	
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Thr Thr Gly Val Tyr Arg Ile	Met Thr Arg Gly Leu	Leu Gly Ser	
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Tyr Gln Ala Gly Ala Gly Val Met Val Glu Gly Val Phe His Thr	
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Leu Trp His Thr Thr Lys Gly Ala Ala Leu Met Ser Gly Glu Gly	
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Arg Leu Asp Pro Tyr Trp Gly Ser Val Lys Glu Asp Arg Leu Cys	
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Tyr Gly Gly Pro Trp Lys Leu Gln His Lys Trp Asn Gly Gln Asp	
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Glu Val Gln Met Ile Val Val Glu Pro Gly Lys Asn Val Lys Asn	
1600 1605 1610	
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Val Gln Thr Lys Pro Gly Val Phe Lys Thr Pro Glu Gly Glu Ile	
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Gly Ala Val Thr Leu Asp Phe Pro Thr Gly Thr Ser Gly Ser Pro	
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Ile Val Asp Lys Asn Gly Asp Val Ile Gly Leu Tyr Gly Asn Gly	
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Val Ile Met Pro Asn Gly Ser Tyr Ile Ser Ala Ile Val Gln Gly	
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Glu Arg Met Asp Glu Pro Ile Pro Ala Gly Phe Glu Pro Glu Met	
1675 1680 1685	
ctg agg aaa aaa cag atc act gta ctg gat ctc cat ccc ggc gcc	5205
Leu Arg Lys Lys Gln Ile Thr Val Leu Asp Leu His Pro Gly Ala	
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Gly Lys Thr Arg Arg Ile Leu Pro Gln Ile Ile Lys Glu Ala Ile	
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aac aga aga ctg aga aca gcc gtg cta gca cca acc agg gtt gtg	5295
Asn Arg Arg Leu Arg Thr Ala Val Leu Ala Pro Thr Arg Val Val	
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Ala Ala Glu Met Ala Glu Ala Leu Arg Gly Leu Pro Ile Arg Tyr	
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cag aca tcc gca gtg ccc aga gaa cat aat gga aat gag att gtt	5385
Gln Thr Ser Ala Val Pro Arg Glu His Asn Gly Asn Glu Ile Val	
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Asp Val Met Cys His Ala Thr Leu Thr His Arg Leu Met Ser Pro	
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cac agg gtg ccg aac tac aac ctg ttc gtg atg gat gag gct cat	5475
His Arg Val Pro Asn Tyr Asn Leu Phe Val Met Asp Glu Ala His	
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Lys Val Glu Leu Gly Glu Ala Ala Ala Ile Phe Met Thr Ala Thr	
1810 1815 1820	
cca cca ggc act tca gat cca ttc cca gag tcc aat tca cca att	5610
Pro Pro Gly Thr Ser Asp Pro Phe Pro Glu Ser Asn Ser Pro Ile	
1825 1830 1835	
tcc gac tta cag act gag atc ccg gat cga gct tgg aac tct gga	5655
Ser Asp Leu Gln Thr Glu Ile Pro Asp Arg Ala Trp Asn Ser Gly	
1840 1845 1850	
tac gaa tgg atc aca gaa tac acc ggg aag acg gtt tgg ttt gtg	5700
Tyr Glu Trp Ile Thr Glu Tyr Thr Gly Lys Thr Val Trp Phe Val	
1855 1860 1865	
cct agt gtc aag atg ggg aat gag att gcc ctt tgc cta caa cgt	5745
Pro Ser Val Lys Met Gly Asn Glu Ile Ala Leu Cys Leu Gln Arg	
1870 1875 1880	
gct gga aag aaa gta gtc caa ttg aac aga aag tcg tac gag acg	5790
Ala Gly Lys Lys Val Val Gln Leu Asn Arg Lys Ser Tyr Glu Thr	
1885 1890 1895	
gag tac cca aaa tgt aag aac gat gat tgg gac ttt gtt atc aca	5835
Glu Tyr Pro Lys Cys Lys Asn Asp Asp Trp Asp Phe Val Ile Thr	
1900 1905 1910	
aca gac ata tct gaa atg ggg gct aac ttc aag gcg agc agg gtg	5880
Thr Asp Ile Ser Glu Met Gly Ala Asn Phe Lys Ala Ser Arg Val	
1915 1920 1925	
att gac agc cgg aag agt gtg aaa cca acc atc ata aca gaa gga	5925
Ile Asp Ser Arg Lys Ser Val Lys Pro Thr Ile Ile Thr Glu Gly	
1930 1935 1940	
gaa ggg aga gtg atc ctg gga gaa cca tct gca gtg aca gca gct	5970
Glu Gly Arg Val Ile Leu Gly Glu Pro Ser Ala Val Thr Ala Ala	
1945 1950 1955	
agt gcc gcc cag aga cgt gga cgt atc ggt aga aat ccg tcg caa	6015

Ser Ala 1960	Ala Gln Arg Arg Gly 1965	Arg Ile Gly Arg Asn 1970	Pro Ser Gln	
gtt ggt Val Gly 1975	gat gag tac tgt tat Asp Glu Tyr Cys Tyr 1980	ggg ggg cac acg aat Gly Gly His Thr Asn 1985	gaa gac gac Glu Asp Asp	6060
tcg aac Ser Asn 1990	ttc gcc cat tgg act Phe Ala His Trp Thr 1995	gag gca cga atc atg Glu Ala Arg Ile Met 2000	ctg gac aac Leu Asp Asn	6105
atc aac Ile Asn 2005	atg cca aac gga ctg Met Pro Asn Gly Leu 2010	atc gct caa ttc tac Ile Ala Gln Phe Tyr 2015	caa cca gag Gln Pro Glu	6150
cgt gag Arg Glu 2020	aag gta tat acc atg Lys Val Tyr Thr Met 2025	gat ggg gaa tac cgg Asp Gly Glu Tyr Arg 2030	ctc aga gga Leu Arg Gly	6195
gaa gag Glu Glu 2035	aga aaa aac ttt ctg Arg Lys Asn Phe Leu 2040	gaa ctg ttg agg act Glu Leu Leu Arg Thr 2045	gca gat ctg Ala Asp Leu	6240
cca gtt Pro Val 2050	tgg ctg gct tac aag Trp Leu Ala Tyr Lys 2055	gtt gca gcg gct gga Val Ala Ala Ala Gly 2060	gtg tca tac Val Ser Tyr	6285
cac gac His Asp 2065	cgg agg tgg tgc ttt Arg Arg Trp Cys Phe 2070	gat ggt cct agg aca Asp Gly Pro Arg Thr 2075	aac aca att Asn Thr Ile	6330
tta gaa Leu Glu 2080	gac aac aac gaa gtg Asp Asn Asn Glu Val 2085	gaa gtc atc acg aag Glu Val Ile Thr Lys 2090	ctt ggt gaa Leu Gly Glu	6375
agg aag Arg Lys 2095	att ctg agg ccg cgc Ile Leu Arg Pro Arg 2100	tgg att gac gcc agg Trp Ile Asp Ala Arg 2105	gtg tac tcg Val Tyr Ser	6420
gat cac Asp His 2110	cag gca cta aag gcg Gln Ala Leu Lys Ala 2115	ttc aag gac ttc gcc Phe Lys Asp Phe Ala 2120	tcg gga aaa Ser Gly Lys	6465
cgt tct Arg Ser 2125	cag ata ggg ctc att Gln Ile Gly Leu Ile 2130	gag gtt ctg gga aag Glu Val Leu Gly Lys 2135	atg cct gag Met Pro Glu	6510
cac ttc His Phe 2140	atg ggg aag aca tgg Met Gly Lys Thr Trp 2145	gaa gca ctt gac acc Glu Ala Leu Asp Thr 2150	atg tac gtt Met Tyr Val	6555
gtg gcc Val Ala 2155	act gca gag aaa gga Thr Ala Glu Lys Gly 2160	gga aga gct cac aga Gly Arg Ala His Arg 2165	atg gcc ctg Met Ala Leu	6600
gag gaa Glu Glu	ctg cca gat gct ctt Leu Pro Asp Ala Leu	cag aca att gcc ttg Gln Thr Ile Ala Leu	att gcc tta Ile Ala Leu	6645

2170	2175	2180	
ttg agt gtg atg acc atg gga	gta ttc ttc ctc ctc	atg cag cgg	6690
Leu Ser Val Met Thr Met Gly	Val Phe Phe Leu Leu	Met Gln Arg	
2185	2190	2195	
aag ggc att gga aag ata ggt	ttg gga ggc gct gtc	ttg gga gtc	6735
Lys Gly Ile Gly Lys Ile Gly	Leu Gly Gly Ala Val	Leu Gly Val	
2200	2205	2210	
gcg acc ttt ttc tgt tgg atg	gct gaa gtt cca gga	acg aag atc	6780
Ala Thr Phe Phe Cys Trp Met	Ala Glu Val Pro Gly	Thr Lys Ile	
2215	2220	2225	
gcc gga atg ttg ctg ctc tcc	ctt ctc ttg atg att	gtg cta att	6825
Ala Gly Met Leu Leu Leu Ser	Leu Leu Leu Met Ile	Val Leu Ile	
2230	2235	2240	
cct gag cca gag aag caa cgt	tcg cag aca gac aac	cag cta gcc	6870
Pro Glu Pro Glu Lys Gln Arg	Ser Gln Thr Asp Asn	Gln Leu Ala	
2245	2250	2255	
gtg ttc ctg att tgt gtc atg	acc ctt gtg agc gca	gtg gca gcc	6915
Val Phe Leu Ile Cys Val Met	Thr Leu Val Ser Ala	Val Ala Ala	
2260	2265	2270	
aac gag atg ggt tgg cta gat	aag acc aag agt gac	ata agc agt	6960
Asn Glu Met Gly Trp Leu Asp	Lys Thr Lys Ser Asp	Ile Ser Ser	
2275	2280	2285	
ttg ttt ggg caa aga att gag	gtc aag gag aat ttc	agc atg gga	7005
Leu Phe Gly Gln Arg Ile Glu	Val Lys Glu Asn Phe	Ser Met Gly	
2290	2295	2300	
gag ttt ctt ttg gac ttg agg	ccg gca aca gcc tgg	tca ctg tac	7050
Glu Phe Leu Leu Asp Leu Arg	Pro Ala Thr Ala Trp	Ser Leu Tyr	
2305	2310	2315	
gct gtg aca aca gcg gtc ctc	act cca ctg cta aag	cat ttg atc	7095
Ala Val Thr Thr Ala Val Leu	Thr Pro Leu Leu Lys	His Leu Ile	
2320	2325	2330	
acg tca gat tac atc aac acc	tca ttg acc tca ata	aac gtt cag	7140
Thr Ser Asp Tyr Ile Asn Thr	Ser Leu Thr Ser Ile	Asn Val Gln	
2335	2340	2345	
gca agt gca cta ttc aca ctc	gcg cga ggc ttc ccc	ttc gtc gat	7185
Ala Ser Ala Leu Phe Thr Leu	Ala Arg Gly Phe Pro	Phe Val Asp	
2350	2355	2360	
gtt gga gtg tcg gct ctc ctg	cta gca gcc gga tgc	tgg gga caa	7230
Val Gly Val Ser Ala Leu Leu	Leu Ala Ala Gly Cys	Trp Gly Gln	
2365	2370	2375	
gtc acc ctc acc gtt acg gta	aca gcg gca aca ctc	ctt ttt tgc	7275
Val Thr Leu Thr Val Thr Val	Thr Ala Ala Thr Leu	Leu Phe Cys	
2380	2385	2390	

cac tat	gcc tac atg gtt ccc	ggg tgg caa gct gag	gca atg cgc	7320
His Tyr	Ala Tyr Met Val Pro	Gly Trp Gln Ala Glu	Ala Met Arg	
2395	2400	2405		
tca gcc	cag cgg cgg aca gcg	gcc gga atc atg aag	aac gct gta	7365
Ser Ala	Gln Arg Arg Thr Ala	Ala Gly Ile Met Lys	Asn Ala Val	
2410	2415	2420		
gtg gat	ggc atc gtg gcc acg	gac gtc cca gaa tta	gag cgc acc	7410
Val Asp	Gly Ile Val Ala Thr	Asp Val Pro Glu Leu	Glu Arg Thr	
2425	2430	2435		
aca ccc	atc atg cag aag aaa	gtt gga cag atc atg	ctg atc ttg	7455
Thr Pro	Ile Met Gln Lys Lys	Val Gly Gln Ile Met	Leu Ile Leu	
2440	2445	2450		
gtg tct	cta gct gca gta gta	gtg aac ccg tct gtg	aag aca gta	7500
Val Ser	Leu Ala Ala Val Val	Val Asn Pro Ser Val	Lys Thr Val	
2455	2460	2465		
cga gaa	gcc gga att ttg atc	acg gcc gca gcg gtg	acg ctt tgg	7545
Arg Glu	Ala Gly Ile Leu Ile	Thr Ala Ala Ala Val	Thr Leu Trp	
2470	2475	2480		
gag aat	gga gca agc tct gtt	tgg aac gca aca act	gcc atc gga	7590
Glu Asn	Gly Ala Ser Ser Val	Trp Asn Ala Thr Thr	Ala Ile Gly	
2485	2490	2495		
ctc tgc	cac atc atg cgt ggg	ggg tgg ttg tca tgt	cta tcc ata	7635
Leu Cys	His Ile Met Arg Gly	Gly Trp Leu Ser Cys	Leu Ser Ile	
2500	2505	2510		
aca tgg	aca ctc ata aag aac	atg gaa aaa cca gga	cta aaa aga	7680
Thr Trp	Thr Leu Ile Lys Asn	Met Glu Lys Pro Gly	Leu Lys Arg	
2515	2520	2525		
ggg ggg	gca aaa gga cgc acc	ttg gga gag gtt tgg	aaa gaa aga	7725
Gly Gly	Ala Lys Gly Arg Thr	Leu Gly Glu Val Trp	Lys Glu Arg	
2530	2535	2540		
ctc aac	cag atg aca aaa gaa	gag ttc act agg tac	cgc aaa gag	7770
Leu Asn	Gln Met Thr Lys Glu	Glu Phe Thr Arg Tyr	Arg Lys Glu	
2545	2550	2555		
gcc atc	atc gaa gtc gat cgc	tca gcg gca aaa cac	gcc agg aaa	7815
Ala Ile	Ile Glu Val Asp Arg	Ser Ala Ala Lys His	Ala Arg Lys	
2560	2565	2570		
gaa ggc	aat gtc act gga ggg	cat cca gtc tct agg	ggc aca gca	7860
Glu Gly	Asn Val Thr Gly Gly	His Pro Val Ser Arg	Gly Thr Ala	
2575	2580	2585		
aaa ctg	aga tgg ctg gtc gaa	cgg agg ttt ctc gaa	ccg gtc gga	7905
Lys Leu	Arg Trp Leu Val Glu	Arg Arg Phe Leu Glu	Pro Val Gly	
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Lys Val Ile Asp Leu Gly Cys Gly Arg Gly Gly Trp Cys Tyr Tyr	
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atg gca acc caa aaa aga gtc caa gaa gtc aga ggg tac aca aag	7995
Met Ala Thr Gln Lys Arg Val Gln Glu Val Arg Gly Tyr Thr Lys	
2620 2625 2630	
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Gly Gly Pro Gly His Glu Glu Pro Gln Leu Val Gln Ser Tyr Gly	
2635 2640 2645	
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Trp Asn Ile Val Thr Met Lys Ser Gly Val Asp Val Phe Tyr Arg	
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cct tct gag tgt tgt gac acc ctc ctt tgt gac atc gga gag tcc	8130
Pro Ser Glu Cys Cys Asp Thr Leu Leu Cys Asp Ile Gly Glu Ser	
2665 2670 2675	
tcg tca agt gct gag gtt gaa gag cat agg acg att cgg gtc ctt	8175
Ser Ser Ser Ala Glu Val Glu Glu His Arg Thr Ile Arg Val Leu	
2680 2685 2690	
gaa atg gtt gag gac tgg ctg cac cga ggg cca agg gaa ttt tgc	8220
Glu Met Val Glu Asp Trp Leu His Arg Gly Pro Arg Glu Phe Cys	
2695 2700 2705	
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Val Lys Val Leu Cys Pro Tyr Met Pro Lys Val Ile Glu Lys Met	
2710 2715 2720	
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Glu Leu Leu Gln Arg Arg Tyr Gly Gly Gly Leu Val Arg Asn Pro	
2725 2730 2735	
ctc tca cgg aat tcc acg cac gag atg tat tgg gtg agt cga gct	8355
Leu Ser Arg Asn Ser Thr His Glu Met Tyr Trp Val Ser Arg Ala	
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Ser Gly Asn Val Val His Ser Val Asn Met Thr Ser Gln Val Leu	
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Leu Leu Asn Ser Asp Thr Ser Lys Ile Lys Asn Arg Ile Glu Arg	
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Pro	Tyr	Arg	Thr	Trp	Asn	Tyr	His	Gly	Ser	Tyr	Asp	Val	Lys	Pro			
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Thr	Gly	Ser	Ala	Ser	Ser	Leu	Val	Asn	Gly	Val	Val	Arg	Leu	Leu			
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Ser	Lys	Pro	Trp	Asp	Thr	Ile	Thr	Asn	Val	Thr	Thr	Met	Ala	Met			
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act	gac	act	act	ccc	ttc	ggg	cag	cag	cga	gtg	ttc	aaa	gag	aag		8760	
Thr	Asp	Thr	Thr	Pro	Phe	Gly	Gln	Gln	Arg	Val	Phe	Lys	Glu	Lys			
2875						2880					2885						
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Val	Asp	Thr	Lys	Ala	Pro	Glu	Pro	Pro	Glu	Gly	Val	Lys	Tyr	Val			
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ctc	aat	gag	acc	acc	aac	tgg	ttg	tgg	gcg	ttt	ttg	gcc	aga	gaa		8850	
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Asn	Ser	Asn	Ala	Ala	Leu	Gly	Ala	Met	Phe	Glu	Glu	Gln	Asn	Gln			
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Trp	Arg	Ser	Ala	Arg	Glu	Ala	Val	Glu	Asp	Pro	Lys	Phe	Trp	Glu			
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Thr	Cys	Ile	Tyr	Asn	Met	Met	Gly	Lys	Arg	Glu	Lys	Lys	Pro	Gly			
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Leu	Gly	Ala	Arg	Phe	Leu	Glu	Phe	Glu	Ala	Leu	Gly	Phe	Leu	Asn			
3010						3015					3020						
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gac acc Asp Thr 3070	cgc atc acg aga gct Arg Ile Thr Arg Ala 3075	gac ttg gaa aat gaa Asp Leu Glu Asn Glu 3080	gct aag gtg Ala Lys Val 9345
ctt gag Leu Glu 3085	ctg ctt gat ggg gaa Leu Leu Asp Gly Glu 3090	cat cgg cgt ctt gcc His Arg Arg Leu Ala 3095	agg gcc atc Arg Ala Ile 9390
att gag Ile Glu 3100	ctc acc tat cgt cac Leu Thr Tyr Arg His 3105	aaa gtt gtg aaa gtg Lys Val Val Lys Val 3110	atg cgc ccg Met Arg Pro 9435
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acc aac Thr Asn 3145	ctg gcc gtc cag ctg Leu Ala Val Gln Leu 3150	gtg agg atg atg gaa Val Arg Met Met Glu 3155	ggg gaa gga Gly Glu Gly 9570
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ccc aaa Pro Lys 3175	gtc agg acc tgg ctg Val Arg Thr Trp Leu 3180	ttt gag aat ggg gaa Phe Glu Asn Gly Glu 3185	gaa aga ctc Glu Arg Leu 9660
agc cgc Ser Arg 3190	atg gct gtc agt gga Met Ala Val Ser Gly 3195	gat gac tgt gtg gta Asp Asp Cys Val Val 3200	aag ccc ctg Lys Pro Leu 9705
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Thr Glu Asp Met Leu Glu Val Trp Asn Arg Val Trp Ile Glu Glu	
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Asn Glu Trp Met Glu Asp Lys Thr Pro Val Glu Lys Trp Ser Asp	
3355 3360 3365	
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Val Pro Tyr Ser Gly Lys Arg Glu Asp Ile Trp Cys Gly Ser Leu	
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att ggc aca aga gcc cga gcc acg tgg gca gaa aac atc cag gtg	10290
Ile Gly Thr Arg Ala Arg Ala Thr Trp Ala Glu Asn Ile Gln Val	
3385 3390 3395	
gct atc aac caa gtc aga gca atc atc gga gat gag aag tat gtg	10335
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<213> West Nile Virus

<400> 9

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Leu Lys Arg Gly Met Pro Arg Val Leu Ser Leu Ile Gly Leu Lys Arg
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Ala Met Leu Ser Leu Ile Asp Gly Lys Gly Pro Ile Arg Phe Val Leu
35 40 45

Ala Leu Leu Ala Phe Phe Arg Phe Thr Ala Ile Ala Pro Thr Arg Ala
50 55 60

Val Leu Asp Arg Trp Arg Gly Val Asn Lys Gln Thr Ala Met Lys His
65 70 75 80

Leu Leu Ser Phe Lys Lys Glu Leu Gly Thr Leu Thr Ser Ala Ile Asn
85 90 95

Arg Arg Ser Ser Lys Gln Lys Lys Arg Gly Gly Lys Thr Gly Ile Ala
100 105 110

Val Met Ile Gly Leu Ile Ala Ser Val Gly Ala Val Thr Leu Ser Asn
115 120 125

Phe Gln Gly Lys Val Met Met Thr Val Asn Ala Thr Asp Val Thr Asp

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145	150	155 160
Ala Met Asp Val Gly Tyr Met Cys Asp Asp Thr Ile Thr Tyr Glu Cys		
	165	170 175
Pro Val Leu Ser Ala Gly Asn Asp Pro Glu Asp Ile Asp Cys Trp Cys		
	180	185 190
Thr Lys Ser Ala Val Tyr Val Arg Tyr Gly Arg Cys Thr Lys Thr Arg		
	195	200 205
His Ser Arg Arg Ser Arg Arg Ser Leu Thr Val Gln Thr His Gly Glu		
	210	215 220
Ser Thr Leu Ala Asn Lys Lys Gly Ala Trp Met Asp Ser Thr Lys Ala		
225	230	235 240
Thr Arg Tyr Leu Val Lys Thr Glu Ser Trp Ile Leu Arg Asn Pro Gly		
	245	250 255
Tyr Ala Leu Val Ala Ala Val Ile Gly Trp Met Leu Gly Ser Asn Thr		
	260	265 270
Met Gln Arg Val Val Phe Val Val Leu Leu Leu Leu Val Ala Pro Ala		
	275	280 285
Tyr Ser Phe Asn Cys Leu Gly Met Ser Asn Arg Asp Phe Leu Glu Gly		
	290	295 300
Val Ser Gly Ala Thr Trp Val Asp Leu Val Leu Glu Gly Asp Ser Cys		
305	310	315 320
Val Thr Ile Met Ser Lys Asp Lys Pro Thr Ile Asp Val Lys Met Met		
	325	330 335
Asn Met Glu Ala Ala Asn Leu Ala Glu Val Arg Ser Tyr Cys Tyr Leu		
	340	345 350
Ala Thr Val Ser Asp Leu Ser Thr Lys Ala Ala Cys Pro Thr Met Gly		
	355	360 365

Glu Ala His Asn Asp Lys Arg Ala Asp Pro Ala Phe Val Cys Arg Gln
 370 375 380

Gly Val Val Asp Arg Gly Trp Gly Asn Gly Cys Gly Leu Phe Gly Lys
 385 390 395 400

Gly Ser Ile Asp Thr Cys Ala Lys Phe Ala Cys Ser Thr Lys Ala Ile
 405 410 415

Gly Arg Thr Ile Leu Lys Glu Asn Ile Lys Tyr Glu Val Ala Ile Phe
 420 425 430

Val His Gly Pro Thr Thr Val Glu Ser His Gly Asn Tyr Ser Thr Gln
 435 440 445

Val Gly Ala Thr Gln Ala Gly Arg Phe Ser Ile Thr Pro Ala Ala Pro
 450 455 460

Ser Tyr Thr Leu Lys Leu Gly Glu Tyr Gly Glu Val Thr Val Asp Cys
 465 470 475 480

Glu Pro Arg Ser Gly Ile Asp Thr Asn Ala Tyr Tyr Val Met Thr Val
 485 490 495

Gly Thr Lys Thr Phe Leu Val His Arg Glu Trp Phe Met Asp Leu Asn
 500 505 510

Leu Pro Trp Ser Ser Ala Gly Ser Thr Val Trp Arg Asn Arg Glu Thr
 515 520 525

Leu Met Glu Phe Glu Glu Pro His Ala Thr Lys Gln Ser Val Ile Ala
 530 535 540

Leu Gly Ser Gln Glu Gly Ala Leu His Gln Ala Leu Ala Gly Ala Ile
 545 550 555 560

Pro Val Glu Phe Ser Ser Asn Thr Val Lys Leu Thr Ser Gly His Leu
 565 570 575

Lys Cys Arg Val Lys Met Glu Lys Leu Gln Leu Lys Gly Thr Thr Tyr
 580 585 590

Gly Val Cys Ser Lys Ala Phe Lys Phe Leu Gly Thr Pro Ala Asp Thr
595 600 605

Gly His Gly Thr Val Val Leu Glu Leu Gln Tyr Thr Gly Thr Asp Gly
610 615 620

Pro Cys Lys Val Pro Ile Ser Ser Val Ala Ser Leu Asn Asp Leu Thr
625 630 635 640

Pro Val Gly Arg Leu Val Thr Val Asn Pro Phe Val Ser Val Ala Thr
645 650 655

Ala Asn Ala Lys Val Leu Ile Glu Leu Glu Pro Pro Phe Gly Asp Ser
660 665 670

Tyr Ile Val Val Gly Arg Gly Glu Gln Gln Ile Asn His His Trp His
675 680 685

Lys Ser Gly Ser Ser Ile Gly Lys Ala Phe Thr Thr Thr Leu Lys Gly
690 695 700

Ala Gln Arg Leu Ala Ala Leu Gly Asp Thr Ala Trp Asp Phe Gly Ser
705 710 715 720

Val Gly Gly Val Phe Thr Ser Val Gly Lys Ala Val His Gln Val Phe
725 730 735

Gly Gly Ala Phe Arg Ser Leu Phe Gly Gly Met Ser Trp Ile Thr Gln
740 745 750

Gly Leu Leu Gly Ala Leu Leu Leu Trp Met Gly Ile Asn Ala Arg Asp
755 760 765

Arg Ser Ile Ala Leu Thr Phe Leu Ala Val Gly Gly Val Leu Leu Phe
770 775 780

Leu Ser Val Asn Val His Ala Asp Thr Gly Cys Ala Ile Asp Ile Ser
785 790 795 800

Arg Gln Glu Leu Arg Cys Gly Ser Gly Val Phe Ile His Asn Asp Val
805 810 815

Glu Ala Trp Met Asp Arg Tyr Lys Tyr Tyr Pro Glu Thr Pro Gln Gly
820 825 830

Leu Ala Lys Ile Ile Gln Lys Ala His Lys Glu Gly Val Cys Gly Leu
835 840 845

Arg Ser Val Ser Arg Leu Glu His Gln Met Trp Glu Ala Val Lys Asp
850 855 860

Glu Leu Asn Thr Leu Leu Lys Glu Asn Gly Val Asp Leu Ser Val Val
865 870 875 880

Val Glu Lys Gln Glu Gly Met Tyr Lys Ser Ala Pro Lys Arg Leu Thr
885 890 895

Ala Thr Thr Glu Lys Leu Glu Ile Gly Trp Lys Ala Trp Gly Lys Ser
900 905 910

Ile Leu Phe Ala Pro Glu Leu Ala Asn Asn Thr Phe Val Val Asp Gly
915 920 925

Pro Glu Thr Lys Glu Cys Pro Thr Gln Asn Arg Ala Trp Asn Ser Leu
930 935 940

Glu Val Glu Asp Phe Gly Phe Gly Leu Thr Ser Thr Arg Met Phe Leu
945 950 955 960

Lys Val Arg Glu Ser Asn Thr Thr Glu Cys Asp Ser Lys Ile Ile Gly
965 970 975

Thr Ala Val Lys Asn Asn Leu Ala Ile His Ser Asp Leu Ser Tyr Trp
980 985 990

Ile Glu Ser Arg Leu Asn Asp Thr Trp Lys Leu Glu Arg Ala Val Leu
995 1000 1005

Gly Glu Val Lys Ser Cys Thr Trp Pro Glu Thr His Thr Leu Trp
1010 1015 1020

Gly Asp Gly Ile Leu Glu Ser Asp Leu Ile Ile Pro Val Thr Leu
1025 1030 1035

Ala Gly Pro Arg Ser Asn His Asn Arg Arg Pro Gly Tyr Lys Thr

1040		1045		1050
Gln Asn Gln Gly Pro Trp Asp Glu Gly Arg Val Glu Ile Asp Phe				
1055		1060		1065
Asp Tyr Cys Pro Gly Thr Thr Val Thr Leu Ser Glu Ser Cys Gly				
1070		1075		1080
His Arg Gly Pro Ala Thr Arg Thr Thr Thr Glu Ser Gly Lys Leu				
1085		1090		1095
Ile Thr Asp Trp Cys Cys Arg Ser Cys Thr Leu Pro Pro Leu Arg				
1100		1105		1110
Tyr Gln Thr Asp Ser Gly Cys Trp Tyr Gly Met Glu Ile Arg Pro				
1115		1120		1125
Gln Arg His Asp Glu Lys Thr Leu Val Gln Ser Gln Val Asn Ala				
1130		1135		1140
Tyr Asn Ala Asp Met Ile Asp Pro Phe Gln Leu Gly Leu Leu Val				
1145		1150		1155
Val Phe Leu Ala Thr Gln Glu Val Leu Arg Lys Arg Trp Thr Ala				
1160		1165		1170
Lys Ile Ser Met Pro Ala Ile Leu Ile Ala Leu Leu Val Leu Val				
1175		1180		1185
Phe Gly Gly Ile Thr Tyr Thr Asp Val Leu Arg Tyr Val Ile Leu				
1190		1195		1200
Val Gly Ala Ala Phe Ala Glu Ser Asn Ser Gly Gly Asp Val Val				
1205		1210		1215
His Leu Ala Leu Met Ala Thr Phe Lys Ile Gln Pro Val Phe Met				
1220		1225		1230
Val Ala Ser Phe Leu Lys Ala Arg Trp Thr Asn Gln Glu Asn Ile				
1235		1240		1245
Leu Leu Met Leu Ala Ala Val Phe Phe Gln Met Ala Tyr His Asp				
1250		1255		1260

Ala Arg Gln Ile Leu Leu Trp Glu Ile Pro Asp Val Leu Asn Ser
1265 1270 1275

Leu Ala Val Ala Trp Met Ile Leu Arg Ala Ile Thr Phe Thr Thr
1280 1285 1290

Thr Ser Asn Val Val Val Pro Leu Leu Ala Leu Leu Thr Pro Gly
1295 1300 1305

Leu Arg Cys Leu Asn Leu Asp Val Tyr Arg Ile Leu Leu Leu Met
1310 1315 1320

Val Gly Ile Gly Ser Leu Ile Arg Glu Lys Arg Ser Ala Ala Ala
1325 1330 1335

Lys Lys Lys Gly Ala Ser Leu Leu Cys Leu Ala Leu Ala Ser Thr
1340 1345 1350

Gly Leu Phe Asn Pro Met Ile Leu Ala Ala Gly Leu Ile Ala Cys
1355 1360 1365

Asp Pro Asn Arg Lys Arg Gly Trp Pro Ala Thr Glu Val Met Thr
1370 1375 1380

Ala Val Gly Leu Met Phe Ala Ile Val Gly Gly Leu Ala Glu Leu
1385 1390 1395

Asp Ile Asp Ser Met Ala Ile Pro Met Thr Ile Ala Gly Leu Met
1400 1405 1410

Phe Ala Ala Phe Val Ile Ser Gly Lys Ser Thr Asp Met Trp Ile
1415 1420 1425

Glu Arg Thr Ala Asp Ile Ser Trp Glu Ser Asp Ala Glu Ile Thr
1430 1435 1440

Gly Ser Ser Glu Arg Val Asp Val Arg Leu Asp Asp Asp Gly Asn
1445 1450 1455

Phe Gln Leu Met Asn Asp Pro Gly Ala Pro Trp Lys Ile Trp Met
1460 1465 1470

Leu Arg Met Val Cys Leu Ala Ile Ser Ala Tyr Thr Pro Trp Ala
 1475 1480 1485

Ile Leu Pro Ser Val Val Gly Phe Trp Ile Thr Leu Gln Tyr Thr
 1490 1495 1500

Lys Arg Gly Gly Val Leu Trp Asp Thr Pro Ser Pro Lys Glu Tyr
 1505 1510 1515

Lys Lys Gly Asp Thr Thr Thr Gly Val Tyr Arg Ile Met Thr Arg
 1520 1525 1530

Gly Leu Leu Gly Ser Tyr Gln Ala Gly Ala Gly Val Met Val Glu
 1535 1540 1545

Gly Val Phe His Thr Leu Trp His Thr Thr Lys Gly Ala Ala Leu
 1550 1555 1560

Met Ser Gly Glu Gly Arg Leu Asp Pro Tyr Trp Gly Ser Val Lys
 1565 1570 1575

Glu Asp Arg Leu Cys Tyr Gly Gly Pro Trp Lys Leu Gln His Lys
 1580 1585 1590

Trp Asn Gly Gln Asp Glu Val Gln Met Ile Val Val Glu Pro Gly
 1595 1600 1605

Lys Asn Val Lys Asn Val Gln Thr Lys Pro Gly Val Phe Lys Thr
 1610 1615 1620

Pro Glu Gly Glu Ile Gly Ala Val Thr Leu Asp Phe Pro Thr Gly
 1625 1630 1635

Thr Ser Gly Ser Pro Ile Val Asp Lys Asn Gly Asp Val Ile Gly
 1640 1645 1650

Leu Tyr Gly Asn Gly Val Ile Met Pro Asn Gly Ser Tyr Ile Ser
 1655 1660 1665

Ala Ile Val Gln Gly Glu Arg Met Asp Glu Pro Ile Pro Ala Gly
 1670 1675 1680

Phe	Glu	Pro	Glu	Met	Leu	Arg	Lys	Lys	Gln	Ile	Thr	Val	Leu	Asp
1685						1690					1695			
Leu	His	Pro	Gly	Ala	Gly	Lys	Thr	Arg	Arg	Ile	Leu	Pro	Gln	Ile
1700						1705					1710			
Ile	Lys	Glu	Ala	Ile	Asn	Arg	Arg	Leu	Arg	Thr	Ala	Val	Leu	Ala
1715						1720					1725			
Pro	Thr	Arg	Val	Val	Ala	Ala	Glu	Met	Ala	Glu	Ala	Leu	Arg	Gly
1730						1735					1740			
Leu	Pro	Ile	Arg	Tyr	Gln	Thr	Ser	Ala	Val	Pro	Arg	Glu	His	Asn
1745						1750					1755			
Gly	Asn	Glu	Ile	Val	Asp	Val	Met	Cys	His	Ala	Thr	Leu	Thr	His
1760						1765					1770			
Arg	Leu	Met	Ser	Pro	His	Arg	Val	Pro	Asn	Tyr	Asn	Leu	Phe	Val
1775						1780					1785			
Met	Asp	Glu	Ala	His	Phe	Thr	Asp	Pro	Ala	Ser	Ile	Ala	Ala	Arg
1790						1795					1800			
Gly	Tyr	Ile	Ser	Thr	Lys	Val	Glu	Leu	Gly	Glu	Ala	Ala	Ala	Ile
1805						1810					1815			
Phe	Met	Thr	Ala	Thr	Pro	Pro	Gly	Thr	Ser	Asp	Pro	Phe	Pro	Glu
1820						1825					1830			
Ser	Asn	Ser	Pro	Ile	Ser	Asp	Leu	Gln	Thr	Glu	Ile	Pro	Asp	Arg
1835						1840					1845			
Ala	Trp	Asn	Ser	Gly	Tyr	Glu	Trp	Ile	Thr	Glu	Tyr	Thr	Gly	Lys
1850						1855					1860			
Thr	Val	Trp	Phe	Val	Pro	Ser	Val	Lys	Met	Gly	Asn	Glu	Ile	Ala
1865						1870					1875			
Leu	Cys	Leu	Gln	Arg	Ala	Gly	Lys	Lys	Val	Val	Gln	Leu	Asn	Arg
1880						1885					1890			
Lys	Ser	Tyr	Glu	Thr	Glu	Tyr	Pro	Lys	Cys	Lys	Asn	Asp	Asp	Trp

1895	1900	1905
Asp Phe Val Ile Thr Thr 1910	Asp Ile Ser Glu Met 1915	Gly Ala Asn Phe 1920
Lys Ala Ser Arg Val Ile 1925	Asp Ser Arg Lys Ser 1930	Val Lys Pro Thr 1935
Ile Ile Thr Glu Gly Glu 1940	Gly Arg Val Ile Leu 1945	Gly Glu Pro Ser 1950
Ala Val Thr Ala Ala Ser 1955	Ala Ala Gln Arg Arg 1960	Gly Arg Ile Gly 1965
Arg Asn Pro Ser Gln Val 1970	Gly Asp Glu Tyr Cys 1975	Tyr Gly Gly His 1980
Thr Asn Glu Asp Asp Ser 1985	Asn Phe Ala His Trp 1990	Thr Glu Ala Arg 1995
Ile Met Leu Asp Asn Ile 2000	Asn Met Pro Asn Gly 2005	Leu Ile Ala Gln 2010
Phe Tyr Gln Pro Glu Arg 2015	Glu Lys Val Tyr Thr 2020	Met Asp Gly Glu 2025
Tyr Arg Leu Arg Gly Glu 2030	Glu Arg Lys Asn Phe 2035	Leu Glu Leu Leu 2040
Arg Thr Ala Asp Leu Pro 2045	Val Trp Leu Ala Tyr 2050	Lys Val Ala Ala 2055
Ala Gly Val Ser Tyr His 2060	Asp Arg Arg Trp Cys 2065	Phe Asp Gly Pro 2070
Arg Thr Asn Thr Ile Leu 2075	Glu Asp Asn Asn Glu 2080	Val Glu Val Ile 2085
Thr Lys Leu Gly Glu Arg 2090	Lys Ile Leu Arg Pro 2095	Arg Trp Ile Asp 2100
Ala Arg Val Tyr Ser Asp 2105	His Gln Ala Leu Lys 2110	Ala Phe Lys Asp 2115

Phe Ala Ser Gly Lys Arg Ser Gln Ile Gly Leu Ile Glu Val Leu
 2120 2125 2130

Gly Lys Met Pro Glu His Phe Met Gly Lys Thr Trp Glu Ala Leu
 2135 2140 2145

Asp Thr Met Tyr Val Val Ala Thr Ala Glu Lys Gly Gly Arg Ala
 2150 2155 2160

His Arg Met Ala Leu Glu Glu Leu Pro Asp Ala Leu Gln Thr Ile
 2165 2170 2175

Ala Leu Ile Ala Leu Leu Ser Val Met Thr Met Gly Val Phe Phe
 2180 2185 2190

Leu Leu Met Gln Arg Lys Gly Ile Gly Lys Ile Gly Leu Gly Gly
 2195 2200 2205

Ala Val Leu Gly Val Ala Thr Phe Phe Cys Trp Met Ala Glu Val
 2210 2215 2220

Pro Gly Thr Lys Ile Ala Gly Met Leu Leu Leu Ser Leu Leu Leu
 2225 2230 2235

Met Ile Val Leu Ile Pro Glu Pro Glu Lys Gln Arg Ser Gln Thr
 2240 2245 2250

Asp Asn Gln Leu Ala Val Phe Leu Ile Cys Val Met Thr Leu Val
 2255 2260 2265

Ser Ala Val Ala Ala Asn Glu Met Gly Trp Leu Asp Lys Thr Lys
 2270 2275 2280

Ser Asp Ile Ser Ser Leu Phe Gly Gln Arg Ile Glu Val Lys Glu
 2285 2290 2295

Asn Phe Ser Met Gly Glu Phe Leu Leu Asp Leu Arg Pro Ala Thr
 2300 2305 2310

Ala Trp Ser Leu Tyr Ala Val Thr Thr Ala Val Leu Thr Pro Leu
 2315 2320 2325

Leu Lys His Leu Ile Thr Ser Asp Tyr Ile Asn Thr Ser Leu Thr
 2330 2335 2340

Ser Ile Asn Val Gln Ala Ser Ala Leu Phe Thr Leu Ala Arg Gly
 2345 2350 2355

Phe Pro Phe Val Asp Val Gly Val Ser Ala Leu Leu Leu Ala Ala
 2360 2365 2370

Gly Cys Trp Gly Gln Val Thr Leu Thr Val Thr Val Thr Ala Ala
 2375 2380 2385

Thr Leu Leu Phe Cys His Tyr Ala Tyr Met Val Pro Gly Trp Gln
 2390 2395 2400

Ala Glu Ala Met Arg Ser Ala Gln Arg Arg Thr Ala Ala Gly Ile
 2405 2410 2415

Met Lys Asn Ala Val Val Asp Gly Ile Val Ala Thr Asp Val Pro
 2420 2425 2430

Glu Leu Glu Arg Thr Thr Pro Ile Met Gln Lys Lys Val Gly Gln
 2435 2440 2445

Ile Met Leu Ile Leu Val Ser Leu Ala Ala Val Val Val Asn Pro
 2450 2455 2460

Ser Val Lys Thr Val Arg Glu Ala Gly Ile Leu Ile Thr Ala Ala
 2465 2470 2475

Ala Val Thr Leu Trp Glu Asn Gly Ala Ser Ser Val Trp Asn Ala
 2480 2485 2490

Thr Thr Ala Ile Gly Leu Cys His Ile Met Arg Gly Gly Trp Leu
 2495 2500 2505

Ser Cys Leu Ser Ile Thr Trp Thr Leu Ile Lys Asn Met Glu Lys
 2510 2515 2520

Pro Gly Leu Lys Arg Gly Gly Ala Lys Gly Arg Thr Leu Gly Glu
 2525 2530 2535

Val	Trp	Lys	Glu	Arg	Leu	Asn	Gln	Met	Thr	Lys	Glu	Glu	Phe	Thr
2540						2545					2550			
Arg	Tyr	Arg	Lys	Glu	Ala	Ile	Ile	Glu	Val	Asp	Arg	Ser	Ala	Ala
2555						2560					2565			
Lys	His	Ala	Arg	Lys	Glu	Gly	Asn	Val	Thr	Gly	Gly	His	Pro	Val
2570						2575					2580			
Ser	Arg	Gly	Thr	Ala	Lys	Leu	Arg	Trp	Leu	Val	Glu	Arg	Arg	Phe
2585						2590					2595			
Leu	Glu	Pro	Val	Gly	Lys	Val	Ile	Asp	Leu	Gly	Cys	Gly	Arg	Gly
2600						2605					2610			
Gly	Trp	Cys	Tyr	Tyr	Met	Ala	Thr	Gln	Lys	Arg	Val	Gln	Glu	Val
2615						2620					2625			
Arg	Gly	Tyr	Thr	Lys	Gly	Gly	Pro	Gly	His	Glu	Glu	Pro	Gln	Leu
2630						2635					2640			
Val	Gln	Ser	Tyr	Gly	Trp	Asn	Ile	Val	Thr	Met	Lys	Ser	Gly	Val
2645						2650					2655			
Asp	Val	Phe	Tyr	Arg	Pro	Ser	Glu	Cys	Cys	Asp	Thr	Leu	Leu	Cys
2660						2665					2670			
Asp	Ile	Gly	Glu	Ser	Ser	Ser	Ser	Ala	Glu	Val	Glu	Glu	His	Arg
2675						2680					2685			
Thr	Ile	Arg	Val	Leu	Glu	Met	Val	Glu	Asp	Trp	Leu	His	Arg	Gly
2690						2695					2700			
Pro	Arg	Glu	Phe	Cys	Val	Lys	Val	Leu	Cys	Pro	Tyr	Met	Pro	Lys
2705						2710					2715			
Val	Ile	Glu	Lys	Met	Glu	Leu	Leu	Gln	Arg	Arg	Tyr	Gly	Gly	Gly
2720						2725					2730			
Leu	Val	Arg	Asn	Pro	Leu	Ser	Arg	Asn	Ser	Thr	His	Glu	Met	Tyr
2735						2740					2745			
Trp	Val	Ser	Arg	Ala	Ser	Gly	Asn	Val	Val	His	Ser	Val	Asn	Met

2750		2755		2760
Thr Ser Gln Val Leu Leu Gly Arg Met Glu Lys Arg Thr Trp Lys				
2765		2770		2775
Gly Pro Gln Tyr Glu Glu Asp Val Asn Leu Gly Ser Gly Thr Arg				
2780		2785		2790
Ala Val Gly Lys Pro Leu Leu Asn Ser Asp Thr Ser Lys Ile Lys				
2795		2800		2805
Asn Arg Ile Glu Arg Leu Arg Arg Glu Tyr Ser Ser Thr Trp His				
2810		2815		2820
His Asp Glu Asn His Pro Tyr Arg Thr Trp Asn Tyr His Gly Ser				
2825		2830		2835
Tyr Asp Val Lys Pro Thr Gly Ser Ala Ser Ser Leu Val Asn Gly				
2840		2845		2850
Val Val Arg Leu Leu Ser Lys Pro Trp Asp Thr Ile Thr Asn Val				
2855		2860		2865
Thr Thr Met Ala Met Thr Asp Thr Thr Pro Phe Gly Gln Gln Arg				
2870		2875		2880
Val Phe Lys Glu Lys Val Asp Thr Lys Ala Pro Glu Pro Pro Glu				
2885		2890		2895
Gly Val Lys Tyr Val Leu Asn Glu Thr Thr Asn Trp Leu Trp Ala				
2900		2905		2910
Phe Leu Ala Arg Glu Lys Arg Pro Arg Met Cys Ser Arg Glu Glu				
2915		2920		2925
Phe Ile Arg Lys Val Asn Ser Asn Ala Ala Leu Gly Ala Met Phe				
2930		2935		2940
Glu Glu Gln Asn Gln Trp Arg Ser Ala Arg Glu Ala Val Glu Asp				
2945		2950		2955
Pro Lys Phe Trp Glu Met Val Asp Glu Glu Arg Glu Ala His Leu				
2960		2965		2970

Arg	Gly	Glu	Cys	His	Thr	Cys	Ile	Tyr	Asn	Met	Met	Gly	Lys	Arg
	2975					2980					2985			
Glu	Lys	Lys	Pro	Gly	Glu	Phe	Gly	Lys	Ala	Lys	Gly	Ser	Arg	Ala
	2990					2995					3000			
Ile	Trp	Phe	Met	Trp	Leu	Gly	Ala	Arg	Phe	Leu	Glu	Phe	Glu	Ala
	3005					3010					3015			
Leu	Gly	Phe	Leu	Asn	Glu	Asp	His	Trp	Leu	Gly	Arg	Lys	Asn	Ser
	3020					3025					3030			
Gly	Gly	Gly	Val	Glu	Gly	Leu	Gly	Leu	Gln	Lys	Leu	Gly	Tyr	Ile
	3035					3040					3045			
Leu	Arg	Glu	Val	Gly	Thr	Arg	Pro	Gly	Gly	Lys	Ile	Tyr	Ala	Asp
	3050					3055					3060			
Asp	Thr	Ala	Gly	Trp	Asp	Thr	Arg	Ile	Thr	Arg	Ala	Asp	Leu	Glu
	3065					3070					3075			
Asn	Glu	Ala	Lys	Val	Leu	Glu	Leu	Leu	Asp	Gly	Glu	His	Arg	Arg
	3080					3085					3090			
Leu	Ala	Arg	Ala	Ile	Ile	Glu	Leu	Thr	Tyr	Arg	His	Lys	Val	Val
	3095					3100					3105			
Lys	Val	Met	Arg	Pro	Ala	Ala	Asp	Gly	Arg	Thr	Val	Met	Asp	Val
	3110					3115					3120			
Ile	Ser	Arg	Glu	Asp	Gln	Arg	Gly	Ser	Gly	Gln	Val	Val	Thr	Tyr
	3125					3130					3135			
Ala	Leu	Asn	Thr	Phe	Thr	Asn	Leu	Ala	Val	Gln	Leu	Val	Arg	Met
	3140					3145					3150			
Met	Glu	Gly	Glu	Gly	Val	Ile	Gly	Pro	Asp	Asp	Val	Glu	Lys	Leu
	3155					3160					3165			
Thr	Lys	Gly	Lys	Gly	Pro	Lys	Val	Arg	Thr	Trp	Leu	Phe	Glu	Asn
	3170					3175					3180			

Gly Glu Glu Arg Leu Ser Arg Met Ala Val Ser Gly Asp Asp Cys
 3185 3190 3195

Val Val Lys Pro Leu Asp Asp Arg Phe Ala Thr Ser Leu His Phe
 3200 3205 3210

Leu Asn Ala Met Ser Lys Val Arg Lys Asp Ile Gln Glu Trp Lys
 3215 3220 3225

Pro Ser Thr Gly Trp Tyr Asp Trp Gln Gln Val Pro Phe Cys Ser
 3230 3235 3240

Asn His Phe Thr Glu Leu Ile Met Lys Asp Gly Arg Thr Leu Val
 3245 3250 3255

Val Pro Cys Arg Gly Gln Asp Glu Leu Val Gly Arg Ala Arg Ile
 3260 3265 3270

Ser Pro Gly Ala Gly Trp Asn Val Arg Asp Thr Ala Cys Leu Ala
 3275 3280 3285

Lys Ser Tyr Ala Gln Met Trp Leu Leu Leu Tyr Phe His Arg Arg
 3290 3295 3300

Asp Leu Arg Leu Met Ala Asn Ala Ile Cys Ser Ala Val Pro Val
 3305 3310 3315

Asn Trp Val Pro Thr Gly Arg Thr Thr Trp Ser Ile His Ala Gly
 3320 3325 3330

Gly Glu Trp Met Thr Thr Glu Asp Met Leu Glu Val Trp Asn Arg
 3335 3340 3345

Val Trp Ile Glu Glu Asn Glu Trp Met Glu Asp Lys Thr Pro Val
 3350 3355 3360

Glu Lys Trp Ser Asp Val Pro Tyr Ser Gly Lys Arg Glu Asp Ile
 3365 3370 3375

Trp Cys Gly Ser Leu Ile Gly Thr Arg Ala Arg Ala Thr Trp Ala
 3380 3385 3390

Glu Asn Ile Gln Val Ala Ile Asn Gln Val Arg Ala Ile Ile Gly
3395 3400 3405

Asp Glu Lys Tyr Val Asp Tyr Met Ser Ser Leu Lys Arg Tyr Glu
3410 3415 3420

Asp Thr Thr Leu Val Glu Asp Thr Val Leu
3425 3430